

REMARKS

This is in response to the Office Action of February 21, 2008. Please reconsider the claims in light of the amendments and remarks. An RCE is being filed with this response to allow the Examiner to reconsider the claims.

Claims 2-3, 20, 22-45 and 51-58 are cancelled. Of the cancelled claims, claims 28, 34, 39, and 52 were independent. Dependent claims 4 and 13 were amended to be independent.

Claims 1-26, 28-44 and 46-57 were rejected under 35 USC § 103(a), as being unpatentable over US Patent 6,009,210 to Kang et al., in view of US Patent 6,151,009 to Kanade et al. (Kanade). The rejection for the cancelled claims is rendered moot. Although the Applicants traverse the basis of the rejection, the Applicants elected to make more specific certain embodiments, and enable expedited issuance. These amendments, however, should not be construed as agreement with the rejection or surrender of scope, which maybe be captured in a later filed continuation application, if so desired.

With this in mind, the Examiner provided the following reasons, which outline the patentability of the now pending claims. For clarity, the Applicants will highlight certain aspects of each of the remaining independent claims, followed by an examination of the cited art.

Independent claim 1 now defines a virtual window, in which the view of the scene is presented. The scene that the user interacts with is different than the user image data. The user image data is the images of the user, who is watching and interacting with the scene being presented in the virtual window. The window is a virtual window, as the view is not fixed. The view frustum is defined by a triangular gaze projection set between outer edges of the virtual window and a position of the head, when the position of the head is substantially normal to about a center point of the virtual window. Figure 1, shown below, shows a view frustum, and the virtual window is 102.

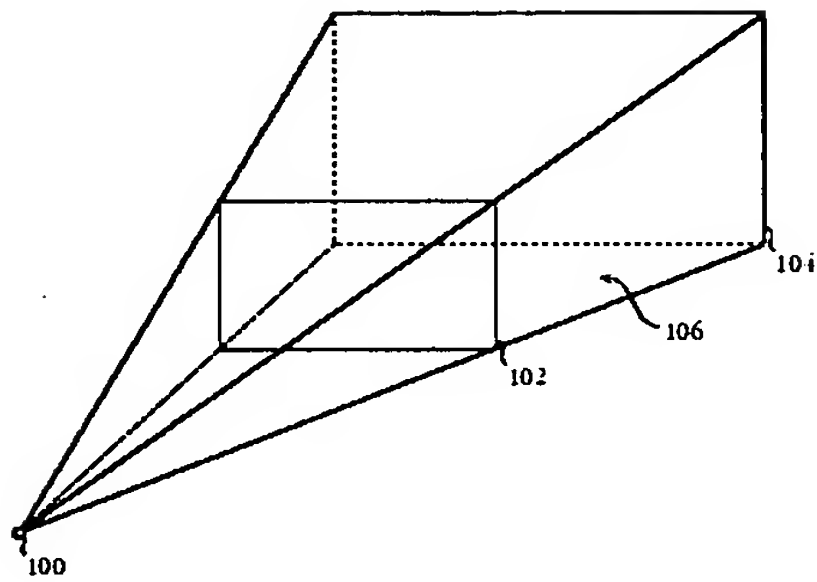


Fig. 1

As defined in the method, the tracking takes place in a search region of the frame of the user image data. The view frustum is adjusted in response to a change in position of the head of the user, the position being away from the normal relative to the center point of the virtual window. The scale of the scene is adjusted according to a change in distance of the head of the user from the capture device. Figures 6A and 6B illustrate examples of the movement of the head. The circle at the apex of the view frustum is the head of the user. In 6A the head moves forward, which expands the view frustum, when looking through the virtual window 132 (e.g., view port). In 6B, the user moves from 133a to 133b. When the user was at 133a, the user is looking at point 135, which is the center point. As the user moves to 133b, the view toward the center point 135 is asymmetric, and the view frustum adjusts, giving the user a wider view to the right, but less view to the left. As noted in paragraph [0040], this can be analogized to looking out of a window.

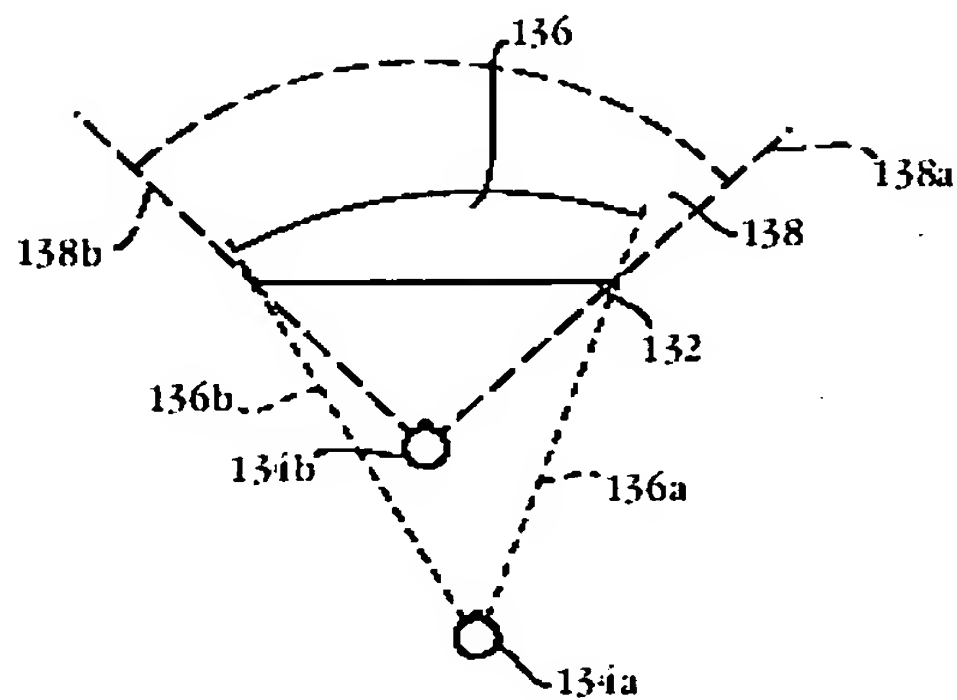


Fig. 6A

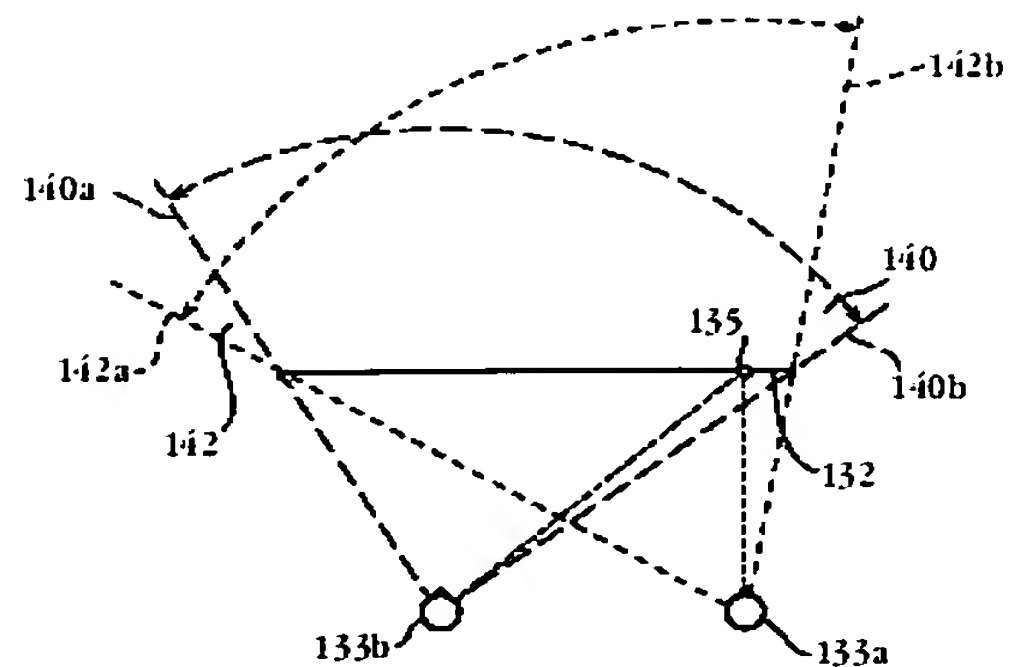


Fig. 6B

It is respectfully submitted that Kang does not teach nor suggest the elements presented in amended independent claims, and Kang combined with Kanade does not cure the deficiencies of Kang. As repeated in this Office Action, the Office confirms that Kang does not teach adjusting the scale of the scene in accordance with a change in distance of the head of the user from a capture device. In this amendment, the claims were clarified to better define the virtual window and the view frustum. Given the added claim language, and the explained definition of the terms, with reference to the as-filed application, the Applicants submit that the combination of Kang and Kanade fail to render the now amended claims obvious.

Kang is concerned with a different technology. Namely, determining the rotation of the user's head. To do this processing, Kang explicitly relies on keeping the user at a distance, so that the face appears to be a "planar surface", as processed by the affine model. See Col. 5, lines 58-3, Col 6, lines 46-52. If the user moves near the camera too much, then the processing will be void. Fig. 4 of Kang does not teach what happens if a user gets close or moves away from the camera, but simply teaches a method for measuring the effect of moving along the camera axis, to determine head tilt. Consequently, there is no teaching regarding a view frustum, nor is there any suggestion that a change in position would change the view frustum.

Kang, to the contrary, is solely directed toward head turn/tilt and commands to move the scene, irrespective of any change of view frustum, scale, etc. To point this out, the Examiner is kindly requested to carefully read col. 8, lines 43-49, which are reproduced below:

"The system would respond by first turning the viewpoint of the virtual scene. However, because it detected the same deviated face posture longer than a preset time threshold (2 seconds in the preferred embodiment), it continues to rotate the viewpoint of the virtual scene in the same manner until the head posture changes."

As recited, when a user in Kang detects that the head turns, the system will start to rotate the scene. This rotation happens even when the user does not change in position, relative to the camera. Therefore, this cannot be a view frustum, and no change in view frustum is taught. Simply put, Kang teaches to use the head movement of up, down, left,

right, as a control to pan a camera (from a fixed point, far enough to not violate the effine model). Also, this free rotation of the scene violates the defined use of a view frustum, as claimed. It is also pointed out that the Office, on page 3 of the Office Action (item d.), correlated "view frustum" as simply a view of the user into the virtual world. The view frustum, as now defined in the claims, is more than a view. The view frustum is related to the virtual window (or view port), and the view frustum changes depending on the position of the user's head. If the user simply looks to the left, the view frustum, as claimed, does not change. The position of the user user's head, as defined in the claims, is important. Accordingly, the Applicants respectfully request the Office to give the terms, now defined in the claims, their full claimed scope and interpretation.

As noted above, the office applies Kanade to teach depth capturing. Depth capturing is claimed in dependent claim 7, which is believed to be patentable for at the same reasons the independent claims are patentable. Adjusting the scale of the scene, according to the a change in distance of the head of the user from the capture device, is not taught by Kanade. The office, on page 4 of the Office Action, item 12, notes that one of ordinary skill in the art would teach the adjustment of scale. However, it is respectfully pointed out that the user in the scene of Kanade is, himself, placed in the scene. The user's action, therefore, is not going to change the scene, either in scale nor in view frustum. When the user in the scene moves his head's position, no adjustment is made to a view frustum. Consequently, although Kanade shows a way of allowing a user to interact with virtual objects, the teachings of Kanade do not add more to what is taught by Kang, and in fact, are directed to a different field of image processing.

Independent claim 4 is directed to another embodiment, which also recites aspects of claim 1. Claim 4 further recites that the virtual position of the head being away from normal relative to the center point of the virtual window changes an angle of the triangular gaze projection. The change in angle of the triangular gaze projection displays a change in viewing angle of the scene provided by a video clip. An example of this embodiment was discussed in detail with regard to Figures 6A and 6B.

Independent claim 13, 14, and 46 additionally recite elements believed to be patentable, as explained with reference to claim 1. However, in claims 12, 14 and 46, the

translating of the view-frustum in accordance with the change in position of the head of the user is further defined. A example is provided in the as-filed application with reference to Figure 8, shown below.

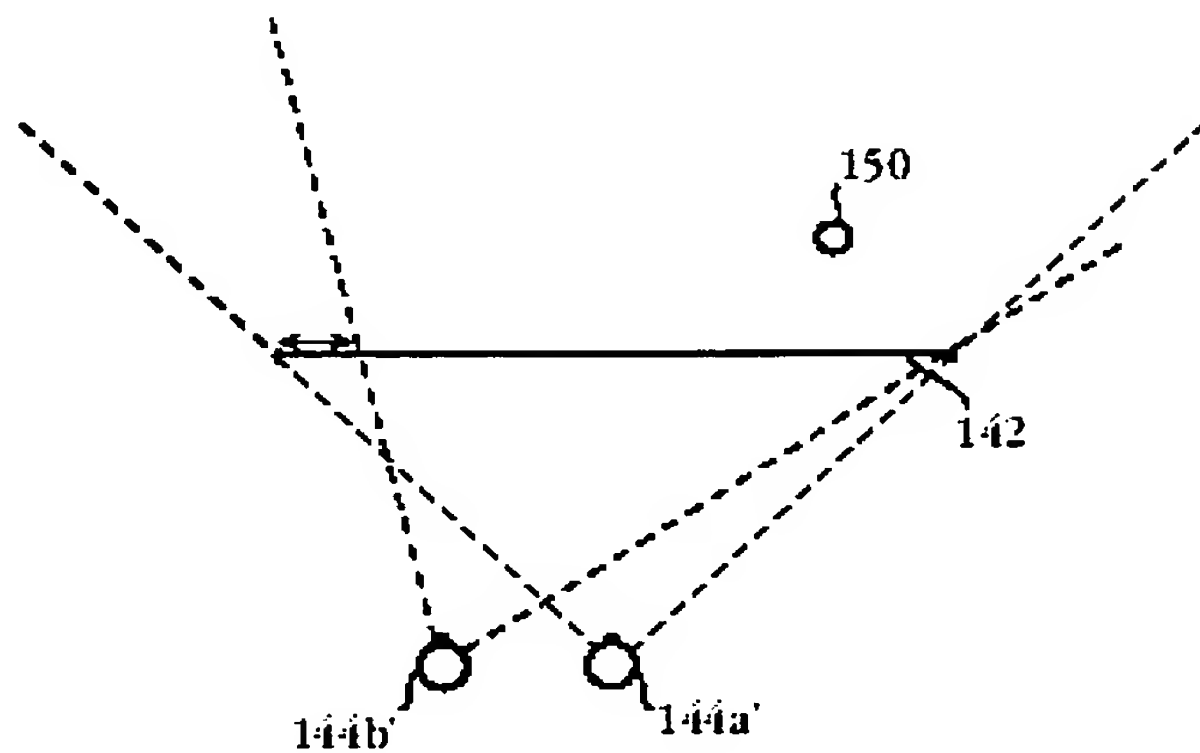


Fig. 8

As claimed, the translating occurs while maintaining or keeping constant a focus on an object 150 in the scene through adjustment of a view port size.

It is submitted that the elements claimed by way of independent claims 4, 13, 14, and 46 provide additional novelty, and are not taught nor suggested by the combination of Kang and Kanade. Accordingly, the Applicants respectfully request the Examiner to reconsider the rejections and amended claims, in line with the filed RCE.

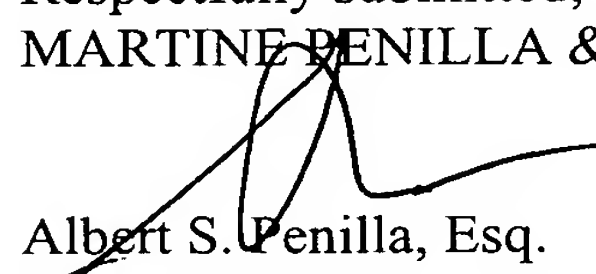
A conference call was attempted with the Examiner on April 21, 2008, however the Examiner indicated that it was the policy of his supervisor to reject after-final interviews. As an RCE is being filed with this amendment, the Examiner is kindly requested to contact the undersigned if any additional clarity can be provided, before issuing an office action.

In view of the foregoing, Applicants respectfully submit that all of the pending claims are in condition for allowance. A notice of allowance is respectfully requested.

Application No. 10/663,236
Amendment dated: April 22, 2008
Responsive to Office Action Dated Feb. 21, 2008

In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 774-6903. If any fees are due in connection with the filing of this paper, then the Commissioner is authorized to charge such fees to Deposit Account No. 50-0805 (Order No. SONYP029). A copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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